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DEATH AND THE CHEMIST

What are the chances that one stands to escape serious organic injury when working with extremely poisonous substances, ignorant of the toxic nature of the substances involved, and unaware of the necessity of taking precautionary measures?

Even today with the increasing knowledge of the science of toxicology and with the advent of forced ventilation, chemists run definite risks. The risks, however, were infinitely greater during the eighteenth and beginning of the nineteenth century when many great chemists seemed to be unaware of the necessity of taking precautions and behaved carelessly in the laboratories. A reasonable speculation may be that many of these chemists owed their early death or disability to negligence and careless handling of chemicals, especially poisonous ones.

Carl Wilhelm Scheele

When we read Scheele's papers we marvel at the fact that "the man survived his experiments with hydrocyanic acid which he tasted, inhaled, and smelled," and with arsine to which he exposed himself.

Scheele also discovered chlorine, arsenic acid, various arsenates, arsenites, and hydrogen fluoride. He worked with hydrogen fluoride during the last year of his life. HF is notorious for its injurious effect upon the early workers. Sir Humphrey Davy, who had also been working with it, had been very sick after exposure to its vapours; so also were Gay-Lussac and Thenard.

Scheele also worked with heavy metal compounds such as gold, silver, lead, mercury(I) and mercury(II) salts, and a host of other toxic ions. (He was the first to point out that mercury exhibits two oxidation states.) Mercury compounds were common items in the apothecary stores of that era. They were used for all diseases for which no cure was known. For Scheele mercury compounds had a special fascination, and he experimented with them continuously. Actually Scheele's discovery of oxygen was performed by heating either mercury(II) oxide, nitrate or carbonate.

Those who have read Scheele's papers know that experimentation for him also meant tasting the substance he experimented with and the products he obtained. Thus, Scheele must have consumed a great deal of heavy metal ions and other poisons during his short life.

Young Scheele, who was known to be of robust health and a descendant of a healthy stock, became an invalid at 35. At 42 he laments about his rheumatism which is "the miserable lot of apothecaries" and about his other unbearable physical sufferings. He is in a melancholy mood and he is bitter. In his letters he grumbles of weariness and dejection which are "even harder to bear than the physical sufferings." Scheele sank into the deep valley of depression, at a time when his fame was at its climax and his country and the world bestowed the highest honours upon him.

A vivid description of the psychic changes produced by mercury poisoning with its spells of melancholy is found in the character of the Mad Hatter in "Alice in Wonderland." Scheele's ailments and moods fit the description.

Sir Humphrey Davy

Sir Humphrey Davy was several times on the verge of death because of his reckless behaviour in the laboratory. He liked excitement and adventure because of his poetical nature; a great motto in his early life was "live dangerously."

Even before he came to the Royal Institution, while working at Bristol, Davy became seriously ill on two occasions, after having inhaled hydrogen fluoride, nitrous oxide, and chlorine. According to Gregory, it nearly cost him his life and required a long recuperative visit to his native place. But this did not teach him a lesson of caution and the necessity of guarding against the dangers involved in pioneering laboratory research. In those days ability to return to work implied complete restoration of good health. It did not occur to Davy that, in spite of the recovery, the poisonings may have left an indelible imprint on the heart, liver, and kidneys, and that after-effects would follow in due time. He continued his former mode of life with all the risks involved in it.

His brother, Dr. John Davy, writes about it as follows:

"His boldness in experimenting was remarkable. In the operations in the laboratory danger was very much forgotten, and exposure to danger was an everyday occurrence."

Davy, who like Scheele was of robust constitution in his youth, became an invalid at 33.

Editor's note: *The Copper Ion* is a weekly publication of Ivar Peterson's grade 12 chemistry class at Kingston Collegiate and Vocational Institute, 235 Frontenac Street, Kingston, Ontario. We have reproduced one whole issue on this page. Mr. Peterson wrote, "As the year progresses, students contribute more and more to the newsletter and design several issues themselves. You may be interested in reprinting some of their contributions. I find this newsletter fun to publish and of considerable interest to the students, especially as they become more and more involved in helping to create it."